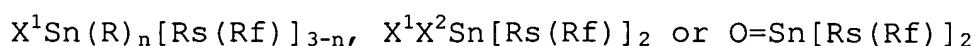


WHAT IS CLAIMED IS:

1. A method of carrying out a reaction comprising the steps of:

mixing at least one organic reaction component with a fluorous reaction component having the formula:



wherein n is 1 or 2, R is a C<sub>1</sub>-C<sub>6</sub> alkyl group, X<sup>1</sup> and X<sup>2</sup> are independently, the same or different, H, F, Cl, Br, I, N<sub>3</sub>, OR<sup>1</sup>, OOR<sup>1</sup>, SR<sup>1</sup>, SeR<sup>1</sup>, CN, NC, NR<sup>1</sup>R<sup>2</sup>, an aryl group, a heteroaryl group, an alkyl group of 1 to 20 carbons, an alkenyl group, an alkynyl group, -C(O)R<sup>3</sup>, M((Rs')(Rf'))<sub>3</sub>, OM((Rs')(Rf'))<sub>3</sub> or OOM((Rs')(Rf'))<sub>3</sub>, wherein M is Si, Ge, or Sn, and wherein R<sup>1</sup> and R<sup>2</sup> are each independently the same or different H, an alkyl group, -SO<sub>2</sub>R<sup>3</sup> or -C(O)R<sup>3</sup>, wherein R<sup>3</sup> is an alkyl group or an aryl group, and wherein Rs and Rs' are each independently the same or different a spacer group, and wherein Rf and Rf' are each independently the same or different a fluorous group;

carrying out a reaction to produce an organic product; and

after producing the organic product, separating any excess of the fluorous reaction component and any fluorous byproduct of the fluorous reaction component using a fluorous separation technique.

2. The method of Claim 1 wherein  $X^1$  and  $X^2$  are independently the same or different an allyl group, Br, Cl, F, I, or H,  $R_s$  is  $-CH_2CH_2-$ , and  $R_f$  is a perfluoroalkyl group.

3. The method of Claim 1 wherein  $R_f$  is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

4. The method of Claim 1 wherein  $R_f$  is a linear perfluoroalkyl group of 3 to 20 carbons, a branched perfluoroalkyl group of 3 to 20 carbons, and a hydrofluoroalkyl group of 3 to 20 carbons, the hydrofluoroalkyl group comprising up to one hydrogen atom for each two fluorine atoms.

5. The method of Claim 1 wherein  $R_f$  is a linear perfluoroalkyl group of 6 to 12 carbons, a branched perfluoroalkyl group of 6 to 12 carbons, or a hydrofluoroalkyl group of 6 to 12 carbons, the hydrofluoroalkyl group comprising up to one hydrogen atom for each two fluorine atoms.

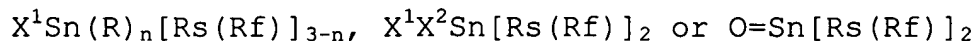
6. The method of Claim 1 wherein  $R^3$  is a perfluoroalkyl group.

7. The method of Claim 1 wherein  $R_s$  is an alkylene group or a phenylene group.

8. The method of Claim 1 wherein  $R_s$  is an alkylene group.

9. A method for carrying out a chemical reaction, comprising the steps of:

combining at least one fluorous reaction component having the formula:



wherein n is 1 or 2, R is a C<sub>1</sub>-C<sub>6</sub> alkyl group, X<sup>1</sup> and X<sup>2</sup> are independently, the same or different, H, F, Cl, Br, I, N<sub>3</sub>, OR<sup>1</sup>, OOR<sup>1</sup>, SR<sup>1</sup>, SeR<sup>1</sup>, CN, NC, NR<sup>1</sup>R<sup>2</sup>, an aryl group, a heteroaryl group, an alkyl group of 1 to 20 carbons, an alkenyl group, an alkynyl group, -C(O)R<sup>3</sup>, M((Rs')(Rf'))<sub>3</sub>, OM((Rs')(Rf'))<sub>3</sub> or OOM((Rs')(Rf'))<sub>3</sub>, wherein M is Si, Ge, or Sn, and wherein R<sup>1</sup> and R<sup>2</sup> are each independently the same or different H, an alkyl group, -SO<sub>2</sub>R<sup>3</sup> or -C(O)R<sup>3</sup>, wherein R<sup>3</sup> is an alkyl group or an aryl group, and wherein Rs and Rs' are each independently the same or different a spacer group, and wherein Rf and Rf' are each independently the same or different a fluorous group, and at least one organic reaction component convertible in the presence of the fluorous reaction component to a product in an organic solvent;

contacting the fluorous reaction component and the organic reaction component in the organic solvent under conditions suitable to produce the product; and

after production of the product, separating any excess of the fluorous reaction component and any fluorous byproduct of the fluorous reaction component using a fluorous separation technique.

10. A chemical compound having the formula:



wherein n is 1 or 2, R is a C<sub>1</sub>-C<sub>6</sub> alkyl group, X<sup>1</sup> is H, F, Cl, Br, I, N<sub>3</sub>, OR<sup>1</sup>, OOR<sup>1</sup> SR<sup>1</sup>, SeR<sup>1</sup>, CN, NC, NR<sup>1</sup>R<sup>2</sup>, an aryl group, a heteroaryl group, an alkyl group of 1 to 20 carbons, an alkenyl group, an alkynyl group, -C(O)R<sup>3</sup>, M((Rs')(Rf'))<sub>3</sub>, OM((Rs')(Rf'))<sub>3</sub> or OOM((Rs')Rf'))<sub>3</sub>, wherein M is Si, Ge, or Sn, and wherein R<sup>1</sup> and R<sup>2</sup> are each independently the same or different H, an alkyl group, -SO<sub>2</sub>R<sup>3</sup> or -C(O)R<sup>3</sup>, wherein R<sup>3</sup> is an alkyl group or an aryl group, and wherein Rs and Rs' are each independently the same or different an alkylene group of 1 to 6 carbons or a phenylene group, and wherein Rf and Rf' are each independently a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

11. The compound of Claim 10 wherein X<sup>1</sup> is an allyl group, Br, Cl, F, I, or H, Rs is -CH<sub>2</sub>CH<sub>2</sub>-, and Rf is a perfluoroalkyl group.

12. The compound of Claim 10 wherein Rf is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

13. The compound of Claim 10 wherein Rf is a linear perfluoroalkyl group of 3 to 20 carbons, a branched perfluoroalkyl group of 3 to 20 carbons, and a hydrofluoroalkyl group of 3 to 20 carbons, the

hydrofluoroalkyl group comprising up to one hydrogen atom for each two fluorine atoms.

14. The compound of Claim 10 wherein Rf is a linear perfluoroalkyl group of 6 to 12 carbons, a branched perfluoroalkyl group of 6 to 12 carbons, or a hydrofluoroalkyl group of 6 to 12 carbons, the hydrofluoroalkyl group comprising up to one hydrogen atom for each two fluorine atoms.

15. ~~The compound of Claim 10 wherein R<sup>3</sup> is a perfluoroalkyl group.~~

16. The compound of Claim 10 wherein Rs is an alkylene group of 1 to 6 carbons.

17. A chemical compound having the formula:



wherein Rs is an alkylene group of 1 to 6 carbons or a phenylene group and wherein Rf is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

18. The compound of Claim 17 wherein Rs is an alkylene group of 1 to 6 carbons.

19. A chemical compound having the formula:



wherein  $X^1$  and  $X^2$  are independently, the same or different, H,  $N_3$ ,  $OR^1$ ,  $OOR^1SR^1$ ,  $SeR^1$ , CN, NC,  $NR^1R^2$ , a heteroaryl group, an alkyl group of 2 to 20 carbons, an alkenyl group, an alkynyl group,  $-C(O)R^3$ ,  $M((Rs')(Rf'))_3$ ,  $OM((Rs')(Rf'))_3$  or  $OOM((Rs')Rf'))_3$ , wherein M is Si, Ge, or Sn, and wherein  $R^1$  and  $R^2$  are each independently the same or different H, an alkyl group,  $-SO_2R^3$  or  $-C(O)R^3$ , wherein  $R^3$  is an alkyl group or an aryl group, wherein Rs and  $Rs'$  are each independently the same or different an alkylene group of 1 to 6 carbons or a phenylene group, and wherein Rf and  $Rf'$  are each independently a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

20. The compound of Claim 19 wherein Rs is an alkylene group of 1 to 6 carbons.

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